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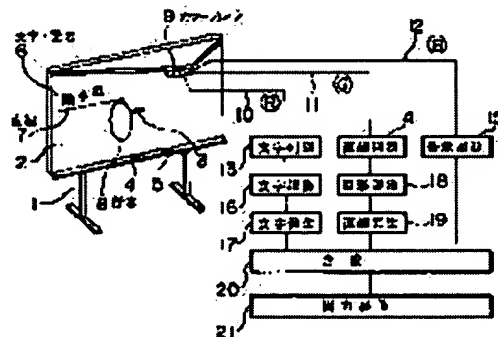
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## (54) ELECTRONIC BLACKBOARD

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To attain the preparation of high-definition electronic documents by separately plotting characters, straight lines and graphics on a screen for plotting while using pens in plural colors, picking up the images of these data while using a specified image sensor, distinguishing these images, replacing these images with electronic characters and electronic straight lines, restoring and synthesizing them.



**SOLUTION:** Characters/symbols 6, a horizontal/vertical straight line 7 and arbitrary graphic 8 are respectively handwritten in different colors on a screen 2 for plotting of an electronic blackboard 1 by pens 3-5 in red, green and blue and the images of these data are picked up by a color camera 9 provided with an optical filter for distinguishing and recognizing them corresponding to respective colors. At a red output terminal 10, for example, the output of the characters 6 is remarkable but other video signal output components are reduced. A character discriminator 13, a straight line discriminator 14 and an arbitrary graphic discriminator 15 discriminate the levels of inputs of these video signals and distinguish the characters, the straight line and the arbitrary graphic. Then, a character/graphic synthesizer 20 synthesizes the electronic character and electronic graphic generated by a character generator 17 and a straight line generator 19 with the graphic from the arbitrary graphic

discriminator 15 and outputs the synthesized result from an output device 21.

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## LEGAL STATUS

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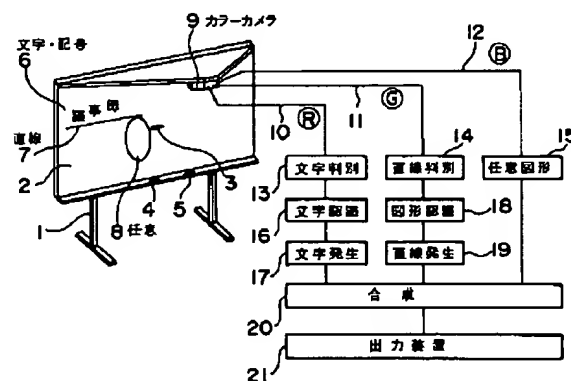
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(54) 【発明の名称】 電子黒板

(57) 【要約】

【課題】 電子黒板を用いて高品位な電子文書を能率的に作成すること。

【解決手段】 描画用面に3色のペンで文字、直線、図形を描き分け、これを該フィルタを備えた画像センサで撮像し、文字、直線、図形を弁別し、弁別した文字、直線を電子文字発生装置、電子直線発生装置で電子文字、電子直線に置換え、画像合成装置で復元合成することにより高品位な電子文書を得る。



## 【特許請求の範囲】

【請求項1】 描画面と、該描画面に文字、記号と、直線と、任意図形の少なくとも3つを描き分ける為の色の異なるペンで描画された、文字、記号と直線と任意図形をそれぞれ前記色で弁別認識するための光学フィルタを備えた画像センサと、

該画像センサに接続された文字認識装置と、前記画像センサに接続された直線認識装置と、前記文字認識装置と直線認識装置と前記任意画像を認識するセンサが接続された文字、直線、画像合成装置と、該文字直線画像合成装置に接続された出力装置とを備えた電子黒板。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は所謂電子黒板に関するものである。

【0002】

【従来の技術】近年電子黒板が広く用いられているが、板面に手書きされた文字、図形をそのまま図形情報として電子的に記録し、コピーを作成するようにした装置が多い。また、電子的に記録した図形情報をパーソナルコンピュータに出力可能な装置もあるが、これも単に、板面に手書きされた文字、図形をそのまま図形情報として取り込むものであった。

【0003】

【発明が解決しようとする課題】前述の従来技術は、単に手書きした文字、図形をそのまま多くのコピーが取れるという利点があるが、手書き文字の品位が劣り、これを議事録等公式の文書として残したい場合には、ワードプロセッサ等で再度作成しなければならないという問題がある。

【0004】本発明はこの欠点を除去し、手書きした文字、図形を高い品位の文字、図形に変換し、そのまま議事録等の公式文書を作成できる文書を作る為の電子黒板を提供することを目的とする。

【0005】

【課題を解決するための手段】本発明はこの目的を達成する為に、手書きの文字、図形を認識し、これを電子文字、図形に変換して、議事録等公式文書にするに耐える高品位な文書を作成できるようにしたものである。

【0006】手書きの文字、図形を電子文字、図形に変換する為には、描画面に混在状態で描画された文字、図形を一括に認識し、これを識別するのは非常にむずかしい為、これをあらかじめ識別し、文字は、文字のみで認識し、図形は図形で認識するようにしたものである。

【0007】このような観点で、電子黒板への描画文書を見ると、文字と水平、垂直の直線及びその他の図形、の3つに大きく分けられる。また、電子黒板を使用する目的の殆んどを占める議事録では、決まった大きさの文字、記号及び水平、垂直の直線で形成される枠及び任意図形に大別される。

【0008】本発明ではまずこれを識別する為に文字、記号と水平、垂直の直線と、任意図形とを色の異なるペンで描画し、これを、色を識別する光学フィルタを備えた画像センサで撮像し、この画像センサで得られた信号から文字判別装置で文字であることを判別し、次にこれを文字認識装置で、何の文字であるかを認識し、次に文字発生装置で電子文字、すなわち、文字コードデータを発生する。

【0009】また、直線は文字と同様の過程を経て電子直線（直線信号）を発生する。手書きの記号は、文字と同様にして図形判別する。これらの電子文字、電子直線及びそのまま撮像される任意図形は文字図形合成装置によって、高品位な文書に合成することができる。

【0010】

【発明の実施の形態】以下この発明の一実施例を図1及び図2に示す。

【0011】電子黒板1の描画面2に、赤、緑、青の3色のペン3、4、5で文字、記号6及び水平、垂直の直線7、及び任意図形8をそれぞれ色を分けて手書きすると、これを図示しない光学フィルタを備えたカラーカメラ9で撮像する。

【0012】カラーカメラ9は描画面2の全体を撮像するが、これに描かれた文字、記号6と直線7と任意図形8は色が異なる為カラーカメラ9の赤色、緑色、青色の出力端子10、11、12に出力される映像信号レベルは例えば、赤色出力端子10には文字6の出力は大きいが他の直線7及び任意図形8の映像信号出力成分は非常に小さくなる。

【0013】同様に緑色の出力端子11には直線7の映像信号出力は大きいが他の文字6及び任意図形8の信号出力は小さくなる。

【0014】また、青色の出力端子12には任意図形8の映像信号出力は大きいが他の文字6及び直線7の出力は小さくなる。

【0015】従って、これらの映像信号の入力の大小を判定し、規定の出力レベル以上の信号を出力する文字判別装置13及び直線判別装置14、及び任意図形判別装置15で、文字、直線、任意図形を弁別できる。

【0016】文字判別装置13の出力は、文字認識装置16に入力され、手書き文字を何という文字であるか認識された後次の文字発生装置17に送られる。

【0017】同様に直線判別装置14の出力は図形識別装置18に入力されどの方向のどれだけの長さの直線であるかを認識された後次の直線発生装置19に送られる。

【0018】文字発生装置17、直線発生装置19で発生した電子文字及び、電子図形は次の文字図形合成装置20に送られ、同時に任意図形判別装置15から送られた図形と合成され、高品位な電子文書が作られ出力装置21から出力される。

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【0019】なお、図2に示すよう、描画用面2には、手書き文字6を、文字認識装置で認識しやすいように書くための、カラーカメラ9では検知できないが人の目には見える補助線22と、同様に手書き直線7を描くための補助線23が記入されている。

【0020】この補助線により文字及び直線の認識率が高まり、能率的に高品位な電子文書を作成することができる。

【0021】

【発明の効果】以上述べた如く本発明によれば、電子黒板に手書き文書を記入すれば、自動的に高品位な電子文書を作成することができる為、ビジネス効率を著しく高

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めることができ、また、電子黒板の使用価値も非常に高くすることができる。

【図面の簡単な説明】

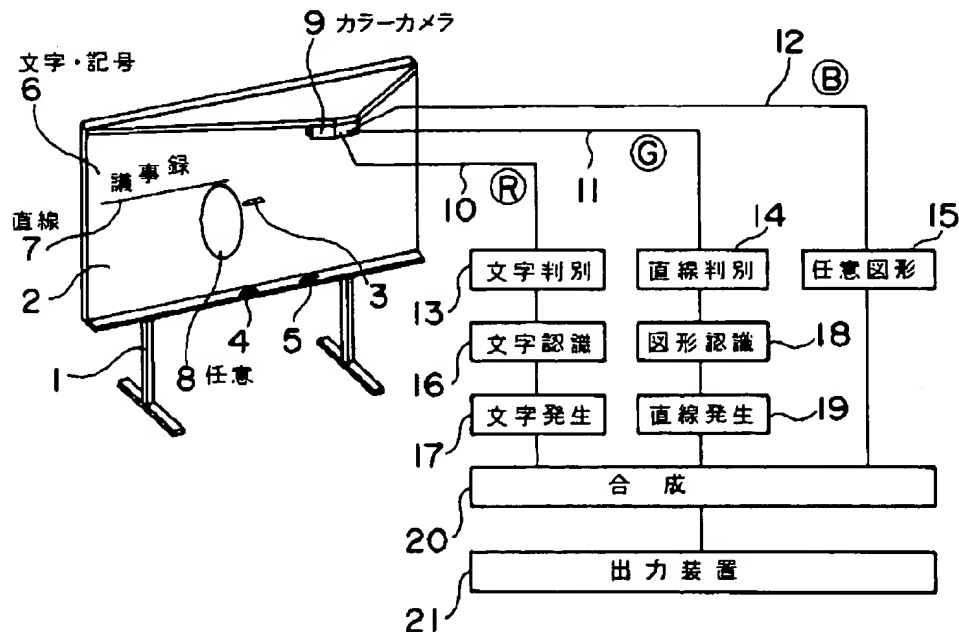
【図1】本発明の一実施例を示すシステム構成図

【図2】本発明の描画用面の補助線の一例を示す正面図

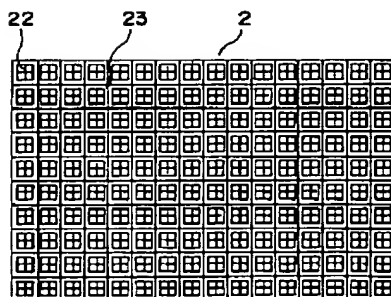
【符号の説明】

2：描画用面、3：赤色ペン、4：緑色ペン、5：青色ペン、9：カラーカメラ、13：文字判別装置、14：直線判別装置、15：任意図形判別装置、16：文字認識装置、17：文字発生装置、18：図形認識装置、19：直線発生装置、20：文字図形合成装置。

【図1】



【図2】



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the so-called electronic blackboard.

[0002]

[Description of the Prior Art] Although the electronic blackboard is used widely in recent years, there is much equipment which records electronically the alphabetic character and graphic form which were written by the plate surface by hand as graphic form information as it is, and created the copy. Moreover, the equipment in which an output is possible was in the personal computer about the graphic form information recorded electronically, and this was also that to which the alphabetic character written by the plate surface by hand and a graphic form are only incorporated as graphic form information as it is.

[0003]

[Problem(s) to be Solved by the Invention] Although the above-mentioned conventional technique has the advantage that many copies can take the alphabetic character and graphic form which were only written by hand as it is, there is a problem that it must create again with a word processor etc. for the grace of a handwriting alphabetic character to be inferior and leave this as documents of a formula, such as the minutes.

[0004] This invention removes this fault, changes into the alphabetic character of high grace, and a graphic form the alphabetic character and graphic form which were written by hand, and aims at offering the electronic blackboard for making the document which can draw up formula documents, such as the minutes, as they are.

[0005]

[Means for Solving the Problem] In order to attain this purpose, this invention recognizes a handwritten alphabetic character and a graphic form, changes this into an electronic alphabetic character and a graphic form, and enables it to draw up the high-definition document which bears for making it formula documents, such as the minutes.

[0006] The alphabetic character and graphic form which were drawn in the state of mixture by the field for drawing in order to change a handwritten alphabetic character and a graphic form into an electronic alphabetic character and a graphic form are recognized to a package, since it is very difficult to identify this, this is identified beforehand, an alphabetic character is recognized only in written form, and a graphic form is recognized diagrammatically.

[0007] In such a viewpoint, if the drawing document to an electronic blackboard is seen, graphic form \*\* of a straight line horizontal to an alphabetic character and vertical and others will be large to three, and it will be divided. Moreover, it is divided roughly into the frame and arbitration graphic form which are formed in the alphabetic character, the notation, and the horizontal and vertical straight line of the regular magnitude with the minutes which occupy \*\*\*\*\* to use an electronic blackboard.

[0008] A straight line horizontal in an alphabetic character and a notation, in order to identify this first in this invention, and vertical, An arbitration graphic form is drawn with the pen with which colors differ,

and it picturizes by the image sensor equipped with the light filter which identifies a color for this, and distinguishes that it is an alphabetic character with alphabetic character distinction equipment from the signal acquired by this image sensor. Next, this with a character reader It recognizes what alphabetic character it is, and then an electronic alphabetic character, i.e., character code data, is generated with an alphabetic character generator.

[0009] Moreover, a straight line generates an electronic straight line (straight-line signal) through the same process as an alphabetic character. Graphic form distinction of the handwritten notation is carried out like an alphabetic character. These electronic alphabetic characters, an electronic straight line, and the arbitration graphic form picturized as it is are compoundable in a high-definition document with an alphabetic character graphic form synthesizer unit.

[0010]

[Embodiment of the Invention] One example of this invention is shown in drawing 1 and drawing 2 below.

[0011] If a color is divided and an alphabetic character, a notation 6, the horizontal and vertical straight line 7, and the arbitration graphic form 8 are written by hand with the pens 3, 4, and 5 of three colors of red, green, and blue to the field 2 for drawing of an electronic blackboard 1, respectively, it will picturize with the color camera 9 equipped with the light filter which does not illustrate this.

[0012] Although the output of an alphabetic character 6 of the video-signal level outputted to the red of the color camera 9 and the green and blue output terminals 10, 11, and 12 since colors differ is [ the alphabetic character and notation 6 which were drawn on this although the color camera 9 picturized the whole drawing surface 2, a straight line 7, and the arbitration graphic form 8 ] large to the red output terminal 10, the video-signal output component of other straight lines 7 and the arbitration graphic form 8 becomes very small.

[0013] Although the video-signal output of a straight line 7 is large to the green output terminal 11 similarly, the signal output of other alphabetic characters 6 and the arbitration graphic form 8 becomes small.

[0014] Moreover, although the video-signal output of the arbitration graphic form 8 is large to the blue output terminal 12, other alphabetic characters 6 and the output of a straight line 7 become small at it.

[0015] Therefore, the size of an input of these video signals is judged and it can discriminate from an alphabetic character, a straight line, and an arbitration graphic form with the alphabetic character distinction equipment 13 which outputs the signal more than a regular output level, straight-line distinction equipment 14, and arbitration graphic form distinction equipment 15.

[0016] The output of alphabetic character distinction equipment 13 is inputted into a character reader 16, and an alphabetic character called what in a handwriting alphabetic character it is, and after having been recognized, it is sent to the following alphabetic character generator 17.

[0017] Similarly, after the output of straight-line distinction equipment 14 is inputted into the graphic form identification unit 18 and has it recognized the straight line of the die length of which of which direction it is, it is sent to the following straight-line generator 19.

[0018] It is compounded with the graphic form which was sent to the following alphabetic character graphic form synthesizer unit 20, and was sent to coincidence from arbitration graphic form distinction equipment 15, a high-definition electronic filing document is made, and the electronic alphabetic character generated with the alphabetic character generator 17 and the straight-line generator 19 and an electronic graphic form are outputted from an output unit 21.

[0019] In addition, with the color camera 9 for writing to the field 2 for drawing that the handwriting alphabetic character 6 is easy to recognize with a character reader, as shown in drawing 2 , although it is undetectable, the visible auxiliary line 22 and the auxiliary line 23 for drawing the handwriting straight line 7 similarly are entered in people's eyes.

[0020] The recognition rate of an alphabetic character and a straight line increases with this auxiliary line, and a high-definition electronic filing document can be drawn up efficiently.

[0021]

[Effect of the Invention] Since a high-definition electronic filing document can be automatically drawn

up according to this invention if a handwriting document is entered in an electronic blackboard as stated above, business effectiveness can be raised remarkably and value in use of an electronic blackboard can also be made very high.

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[Translation done.]